

State of West Virginia  
Department of Environmental Protection - Office of Oil and Gas  
Well Operator's Report of Well Work

API 47-001-03351 County Barbour District Philippi  
Quad Audra Pad Name AUD7 Field/Pool Name \_\_\_\_\_  
Farm name Brian E. & Lisa L. Murphy Well Number AUD7 HHS  
Operator (as registered with the OOG) HG Energy II Appalachia, LLC  
Address 5260 Dupont Road City Parkersburg State WV Zip 26101

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey  
Top hole Northing 4330689.52 m Easting 579242.06 m  
Landing Point of Curve Northing 4330402.37 m Easting 579314.60 m  
Bottom Hole Northing 4328020.4 m Easting 581748.9 m

Elevation (ft) 1568' GL Type of Well  New  Existing Type of Report  Interim  Final  
Permit Type  Deviated  Horizontal  Horizontal 6A  Vertical Depth Type  Deep  Shallow  
Type of Operation  Convert  Deepen  Drill  Plug Back  Redrilling  Rework  Stimulate  
Well Type  Brine Disposal  CBM  Gas  Oil  Secondary Recovery  Solution Mining  Storage  Other \_\_\_\_\_  
Type of Completion  Single  Multiple Fluids Produced  Brine  Gas  NGL  Oil  Other \_\_\_\_\_  
Drilled with  Cable  Rotary

Drilling Media Surface hole  Air  Mud  Fresh Water Intermediate hole  Air  Mud  Fresh Water  Brine  
Production hole  Air  Mud  Fresh Water  Brine

Mud Type(s) and Additive(s)  
Mud Type - SOBM, Additives - Lime, Calcium Chloride, Gilsonite, Asphalt, Barite, Emulsifer, Base Oil

Date permit issued July 13, 2018 Date drilling commenced 7/14/18 Date drilling ceased 7/29/18  
Date completion activities began 11/19/18 Date completion activities ceased 12/12/18  
Verbal plugging (Y/N) \_\_\_\_\_ Date permission granted \_\_\_\_\_ Granted by \_\_\_\_\_

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Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

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Freshwater depth(s) ft 160',635',725',730' Open mine(s) (Y/N) depths Y  
Salt water depth(s) ft 1870' Void(s) encountered (Y/N) depths 328' - 336'  
Coal depth(s) ft 320',635',725',730' Cavern(s) encountered (Y/N) depths N  
Is coal being mined in area (Y/N) Y

Reviewed by:

*[Handwritten Signature]*  
5-7-20

API 47-001 - 03351 Farm name Brian E. & Lisa L. Murphy Well number AUD7 HHS

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	42"	30"	72'	N	LS 120#	NA	N (grout)
Surface	26"	20"	417'	N	J-55 94#	333'	Y
Coal	17 1/2"	13 3/8"	827'	N	J-55 54.5#	NA	N (grout)
Intermediate 1	12 3/8"	9 5/8"	2160.2'	N	J-55 38#	NA	Y
Intermediate 2							
Intermediate 3							
Production	8 1/2"	5 1/2"	19593	N	P-110 23#	NA	Y
Tubing							
Packer type and depth set							

Comment Details \_\_\_\_\_

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft <sup>3</sup> /sks)	Volume (ft <sup>3</sup> )	Cement Top (MD)	WOC (hrs)
Conductor	Class A	675	15.60	1.22	820	0	24
Surface	Class A	380 / 453	15.60	1.20	952	Surface	8
Coal	Class A	802	15.60	1.20	962	Surface	8
Intermediate 1	Class A	750	15.60	1.28	887	Surface	8
Intermediate 2							
Intermediate 3							
Production	Class A	4620	Lead 13.5, Tail 14.5	Lead 1.41, Tail 1.16	5727	Surface	8
Tubing							

Drillers TD (ft) 19583' (MD) Loggers TD (ft) \_\_\_\_\_  
 Deepest formation penetrated Marcellus Plug back to (ft) \_\_\_\_\_  
 Plug back procedure \_\_\_\_\_

Kick off depth (ft) 5810' MD

Check all wireline logs run  caliper  density  deviated/directional  induction  
 neutron  resistivity  gamma ray  temperature  sonic

Well cored  Yes  No Conventional Sidewall Were cuttings collected  Yes  No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING \_\_\_\_\_

Conductor - NA Surface Casing - NA Coal Protection Casing - NA Intermediate Casing - NA Production - Run 1 spiral centralizer every 3 joints from the 1st 5.5" long joint to the top of the curve.

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WAS WELL COMPLETED AS SHOT HOLE  Yes  No DETAILS \_\_\_\_\_ W/ Department of Environmental Protection

WAS WELL COMPLETED OPEN HOLE?  Yes  No DETAILS \_\_\_\_\_

WERE TRACERS USED  Yes  No TYPE OF TRACER(S) USED \_\_\_\_\_





**HG Energy II Appalachia, LLC**  
**AUD7 HHS - 47-001-03351**  
**Perforation Record**

Stage Number	Perforation	Perforated	Perforated	Number of	
Number	Date	from MD ft.	to MD ft.	Perforations	Formations
1	11/20/2018	19408	19458	0	
2	11/20/2018	19,206	19,374	49	
3	11/21/2018	19,010	19,178	49	
4	11/21/2018	18,814	18,982	49	
5	11/21/2018	18,618	18,786	49	
6	11/22/2018	18,422	18,590	49	
7	11/22/2018	18,226	18,394	49	
8	11/22/2018	18,030	18,198	49	
9	11/23/2018	17,834	18,002	49	
10	11/23/2018	17,638	17,806	49	
11	11/24/2018	17,442	17,610	49	
12	11/24/2018	17,246	17,414	49	
13	11/24/2018	17,050	17,218	49	
14	11/25/2018	16,854	17,022	49	
15	11/25/2018	16,658	16,826	49	
16	11/25/2018	16,462	16,630	49	
17	11/25/2018	16,266	16,434	49	
18	11/25/2018	16,070	16,238	49	
19	11/26/2018	15,874	16042	49	
20	11/26/2018	15,678	15846	49	
21	11/26/2018	15,482	15650	49	
22	11/26/2018	15,286	15,454	49	
23	11/27/2018	15,090	15,258	49	
24	11/28/2018	14,894	15,062	49	
25	11/28/2018	14,698	14,866	49	
26	11/28/2018	14,502	14,670	49	
27	11/29/2018	14,306	14,474	49	
28	11/29/2018	14,110	14,278	49	
29	11/30/2018	13,914	14,082	49	
30	11/30/2018	13,718	13,886	49	
31	12/1/2018	13,522	13,690	49	
32	12/1/2018	13,326	13,494	49	
33	12/1/2018	13,130	13,298	49	
34	12/1/2018	12,934	13,102	49	
35	12/2/2018	12,738	12,906	49	
36	12/2/2018	12,542	12,710	49	
37	12/3/2018	12,346	12,514	49	
38	12/3/2018	12,150	12,318	49	
39	12/4/2018	11,954	12,122	49	
40	12/4/2018	11,758	11,926	49	
41	12/4/2018	11,562	11730	49	
42	12/5/2018	11366	11534	49	
43	12/5/2018	11170	11338	49	
44	12/5/2018	10974	11142	49	
45	12/6/2018	10778	10946	49	
46	12/6/2018	10582	10750	49	
47	12/7/2018	10386	10554	49	
48	12/7/2018	10190	10358	49	
49	12/7/2018	9988	10162	49	
50	12/8/2018	9786	9960	49	
51	12/8/2018	9584	9758	49	
52	12/9/2018	9382	9556	49	
53	12/9/2018	9180	9354	49	
54	12/10/2018	8978	9152	49	
55	12/10/2018	8776	8950	49	
56	12/10/2018	8574	8748	49	
57	12/11/2018	8372	8546	49	
58	12/11/2018	8170	8344	49	
59	12/11/2018	7968	8142	49	

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**HG Energy II Appalachia, LLC**  
**AUD7 HHS - 47-001-03351**  
**Stimulation Information Per Stage**

Stage Number	Stimulation Date	Avg Pump Rate (BPM)	Avg Pressure (psi)	Breakdown Psi	ISIP (psi)	Amount of Proppant (klbs)	Amount of Water (bbls)	Amount of Acid (gallons)
1	11/20/2018	64.3	11593	n/a	5250		7490	2016
2	11/20/2018	78.7	10,794	6,799	4,882	340.0	12,327	2,016
3	11/21/2018	80.3	10,907	5,696	4,870	215.0	12,607	2,184
4	11/21/2018	77.7	10,378	7,327	5,300	404.0	12,549	966
5	11/21/2018	71.4	9,735	6,911	5,340	463.0	13,045	1,050
6	11/22/2018	73.8	10,520	7,213	5,605	485.0	14,008	1,008
7	11/22/2018	75.5	9,958	6,834	5,220	481.0	12,487	966
8	11/22/2018	78.0	9,172	6,760	5,680	456.0	13,012	966
9	11/23/2018	89.3	9,926	6,207	5,860	469.0	13,099	1,008
10	11/23/2018	75.6	10,189	6,582	5,990	409.0	12,879	1,008
11	11/24/2018	88.8	9,606	6,932	5,620	133.0	9,768	1,050
12	11/24/2018	68.2	10,964	6,195	4,574		4,536	5,208
13	11/24/2018	59.5	9,779	6,560	5,213	30.0	4,711	2,016
14	11/25/2018	68.8	8,616	6,374	5,886	438.0	13,573	1,008
15	11/25/2018	85.1	9,192	6,373	4,893	478.0	13,569	1,008
16	11/25/2018	88.9	9,260	5,806	5,380	493.0	13,335	1,008
17	11/25/2018	83.4	9,141	6,756	5,911	486.0	13,311	1,050
18	11/25/2018	83.1	9,665	6,639	5,339	477.0	13,984	1,008
19	11/26/2018	85.3	9,462	6,990	6,584	440.0	13,556	966
20	11/26/2018	88.4	9,332	6,864	5,864	480.0	14,502	966
21	11/26/2018	85.8	9,830	7,356	6,384	476.0	13,897	966
22	11/26/2018	88.7	9,505	7,179	5,267	481.0	13,875	1,050
23	11/27/2018	83.5	9,721	7,315	5,560	478.0	13,489	1,050
24	11/28/2018	82.3	10,634	7,249	5,520	380.0	12,875	1,050
25	11/28/2018	85.2	9,796	7,167	5,428	487.0	13,578	966
26	11/28/2018	83.9	9,470	7,052	5,788	471.0	13,927	966
27	11/29/2018	74.6	9,529	6,945	5,435	440.0	13,538	1,050
28	11/29/2018	80.9	9,454	7,085	5,731	389.0	12,538	966
29	11/30/2018	84.9	9,782	7,324	5,685	453.0	13,451	924
30	11/30/2018	84.3	9,765	6,958	5,794	459.0	13,131	966
31	12/1/2018	85.1	9,320	7,238	5,594	441.0	13,656	1,008
32	12/1/2018	82.8	9,934	6,675	5,435	244.0	12,386	966
33	12/1/2018	82.5	9,642	6,663	5,463	482.0	14,001	966
34	12/1/2018	86.7	9,324	6,820	5,753	439.0	12,708	1,008
35	12/2/2018	85.8	9,944	7,891	5,841	308.0	13,067	1,008
36	12/2/2018	80.1	9,036	7,543	5580	453.0	12,158	1,008
37	12/3/2018	90.1	9,849	7,109	5,575	385.0	12,908	1,008
38	12/3/2018	89.4	8,951	6,303	5,969	435.0	12,025	1,008
39	12/4/2018	94.9	9,441	6,149	5,871	432.0	12,166	1,008
40	12/4/2018	94.2	9,305	7,115	7,126	463.0	13,054	1,008
41	12/4/2018	93.9	9089	6455	5,680	442.0	11090	924
42	12/5/2018	87.4	9160	6190	6131	434.0	10472	966
43	12/5/2018	85.4	8713	6745	5361	476.0	13232	1050
44	12/5/2018	87.7	10082	6607	5960	325.0	10643	1008
45	12/6/2018	88.8	8686	6657	5634	476.0	12762	1092
46	12/6/2018	83	8612	6077	5620	46.0	12940	1008
47	12/7/2018	88.9	8475	6323	5743	439.0	12776	1008
48	12/7/2018	89.2	8633	6158	5370	480.0	12860	966
49	12/7/2018	85.7	8702	6458	5305	436.0	12599	1008
50	12/8/2018	84.5	8605	7103	5490	463.0	12225	1008
51	12/8/2018	89.6	8517	6382	5340	441.0	12840	1008
52	12/9/2018	84.3	8685	6205	4916	478.0	13600	1008
53	12/9/2018	87.5	8893	7115	5120	474.0	12244	924
54	12/10/2018	85.1	8296	6850	5810	448.0	12515	1050
55	12/10/2018	82.4	8918	7147	5775	247.0	11895	1050
56	12/10/2018	85.2	8300	7216	6950	425.0	13839	1050
57	12/11/2018	86.9	8233	6588	5170	439.0	11166	1806
58	12/11/2018	85.9	8565	7116	5074	124.0	11731	2226
59	12/11/2018	86.5	7961	7361	5250	418.0	10600	1050

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**HG Energy II Appalachia, LLC**  
**AUD7 HHS Actual tops**  
**Lithology/Formation**

	MD		TVD	
Coal	320	325	320	325
Little Lime (~67' thick)	1167	1234	1167	1234
Big Lime (~74' thick)	1234	1308	1234	1308
Big Injun (~52' thick)	1395	1447	1395	1447
Gantz (~74' thick)	1600	1674	1600	1674
Fifth Sand (~11' thick)	2114	2125	2114	2125
Bradford (~10' thick)	3060		3060	
Benson (~15' thick)	3830	3845	3830	3845
Sycamore Grit (~39' thick)	6371	6410		
Geneseo (~56' thick)	7424	7515		
Burket (~ 17' thick)	7515	7542	7327	7342
Tully (~ 40' thick)	7542	7612	7342	7381
Hamilton (~144' thick)	7612	7912	7381	7532
Marcellus Shale (~89' thick)	7947	19593	7532	
T - Onondaga	19593			

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CASING INFORMATION							SHOWS (Fresh Water, Oil, Gas)		
Conductor	Set 114' of 20" casing J55 94lb/ft						Depth	Formation	Show
	Surface	Intermediate 1	Intermediate 2	Production					
No. Jts. Run				424					
Hole Depth				19593					
Csg Size	9 5/8			5.5					
Wt.	36			23					
Grade	J-55			P-110					
Type Thrd				CDC/HTQ					
New/Used				New					
Depth Set	2,160			19,567					
Plug				Yes					
Shoe				Yes					
Basket				No					
Centralizers				184					
Cmt Return				25					
Sks. Lead				1255					
Type Cmt Lead				Class A					
Sks. Tail				3150					
Tail				Class A					
Top Cmt.				Surface					

4405 T  
 1769.5  
 3654  
 5423.5

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HG ENERGY LLC

AUD-7 HHS

5 1/2 IN PRODUCTION CASING

**Mud / Cement Spacer System:**

**100 bbls CJ810 PureScrub Spacer + 1 gal/bbl CPC35 @ 13 [lb/gal]**

**Lead System**

1470 sks =

369  
↓

368.5 bbls

50:50 CJ010:CJ910 + 2% CJ020 + 0.2% CJ210F + 0.35% CJ504 + 0.2% CJX157011

Mix Weight: 13.50 [lb/gal]

Yield: 1.41 [cuft/sk]

Mix Water: 6.70 [gal/sk]

**Tail System**

3145 sks =

650  
↓

647.1 bbls

50:50 CJ010:CJ910 + 0.1% CJ210F + 0.1% CJ501 + 0.2% CJ504 + 0.2% CJX157011

Mix Weight: 14.50 [lb/gal]

Yield: 1.16 [cuft/sk]

Mix Water: 4.90 [gal/sk]

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**Displacement Fluid**

415 bbls of Water

Always refigure on location!!!!

58' to Top Hole  
 3,738' to Bottom Hole  
 LATITUDE 39 - 07 - 30  
 TOP HOLE LONGITUDE 80 - 05 - 00  
 BTM HOLE LONGITUDE 80 - 02 - 30  
 1,212' to Top Hole  
 10,057' to Bottom Hole

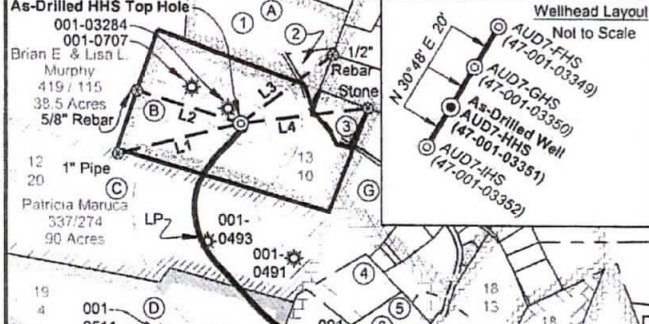
**HG Energy II Appalachia LLC As-Drilled Well No. AUD7 HHS**

**Notes:**  
 Well No. AUD7 HHS  
 WVSPC NAD 1927  
 Top Hole Coordinates  
 N: 226,963.3'  
 E: 1,834,447.5'  
 Landing Point Coordinates  
 N: 226,033.8'  
 E: 1,834,117.2'  
 Bottom Hole Coordinates  
 N: 218,068.2'  
 E: 1,842,527.9'

**Notes:**  
 Well No. AUD7 HHS  
 West Virginia Coordinate System of 1927, North Zone based upon Differential GPS Measurements.  
 Top Hole coordinates Bottom Hole coordinates  
 Latitude: 39°07'18.02" Latitude: 39°05'50.80"  
 Longitude: 80°05'00.63" Longitude: 80°03'17.41"  
 UTM Zone 17, NAD 1983  
 Top Hole Coordinates Bottom Hole Coordinates  
 N: 4,330,689.5m N: 4,328,020.4m  
 E: 579,242.1m E: 581,748.9m  
 Plat orientation and corner and well references are based upon the grid north meridian.  
 Well location references are based upon the magnetic meridian.

No.	TM-Par	Owner	Bk / Pg	Acres
1	13-9	Brian E. & Lisa L. Murphy	419 / 115	15.92
2	13-9.2	Jonathan T. & Kara Keener	421 / 34	1.99
3	13-11	Gene F. Herbert III	403 / 184	2.74
4	18-2.4	David & Sue Cross	238 / 199	5.20
5	18-2.3	Jerry & Annette Stalnaker	342 / 163	4.47
6	18-1.2	Randall Lee Stafford	479 / 148	1.00
7	18-1.3	Randall Lee Stafford	479 / 148	1.00
8	18-1.1	Jerry D. Stalnaker, et ux	224 / 417	1.00
9	18-1.5	Jerry D. Stalnaker, et ux	252 / 481	0.94
10	18-1.4	David & Darius Nuzum	250 / 40	1.17
11	18-1.7	Keith & Sharon Nuzum	461 / 616	0.31
12	18-1.6	Keith & Sharon Nuzum	461 / 616	0.59
13	18-65.2	Samuel & Kenna Wright	342 / 95	3.72
14	18-65.1	Samuel & Kenna Wright	342 / 95	1.50
15	18-3.2	Shelia Maxson	429 / 104	3.00
16	18-3	Stephen S. Maxson	410 / 555	0.50
17	18-3.3	Milton & Ruth Freeman	477 / 61	0.41
18	18-3.1	Milton & Ruth Freeman	234 / 435	5.50
19	18-85.1	Roy Murphy	353 / 106	10.00
20	18-85	Vicki Lawrence	469 / 629	26.50
21	18-88.2	Donald R. Williams	— / —	0.88
22	18-88	Donald & Deborah Williams	419 / 407	36.20
23	18-86	Marvin G. Ketchum, et al	127 / 362	2.00
24	18-88.3	Kristal Williams	381 / 289	0.906
25	18-89	Edward & Sherry Daugherty	470 / 610	0.62
26	18-88.5	Stacey Williams	476 / 425	1.72
27	18-89.1	William & Wilma Daugherty	352 / 140	0.08
28	18-96	Eugene & Linda Williams	456 / 246	0.57
29	18-104	Eugene & Linda Williams	367 / 33	0.44
30	20-4	Donald & Deborah Williams	392 / 87	12.43
31	20-4.2	Justin M. & Jessica D. Luff	391 / 556	13.78
32	20-2.1	William & Wilma Daugherty	273 / 168	3.15

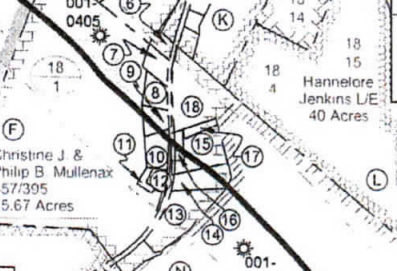
**Lease Owners**  
 A. E. C. Zinn, et ux et al  
 B. Junior & Lucy P. Lantz, et al  
 C. Elsie Malcolm  
 D. Pearl Malcolm  
 E. Lucille C. Chesser  
 F. Orma & Carrie Casto, et al  
 G. Bly S. Mailer, et ux  
 H. Kelsel V. Davis, et ux  
 J. James M. O'Neal, et al  
 K. B. L. Zirkle, et ux  
 L. Prentis B. Jenkins, et al  
 M. Lucy O'Neal



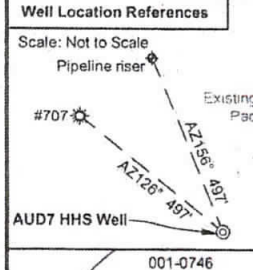
Bearing	Dist.
L1 N 75°54' E	1,037.7'
L2 S 72°37' E	889.5'
L3 S 52°57' W	941.9'
L4 S 82°45' W	1,047.3'

**I, the undersigned, hereby certify that this plat is correct to the best of my knowledge and belief and shows all the information required by law and the rules issued and prescribed by the Department of Environmental Protection.**

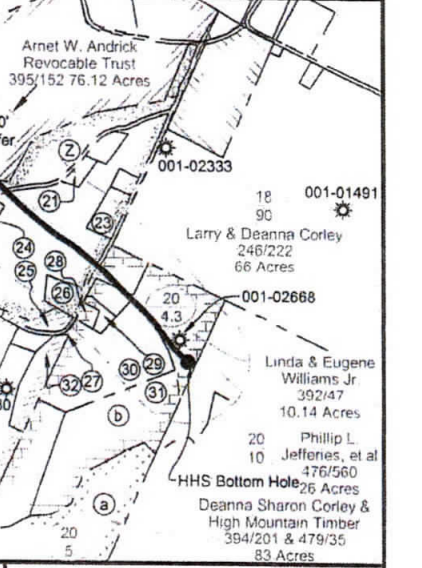
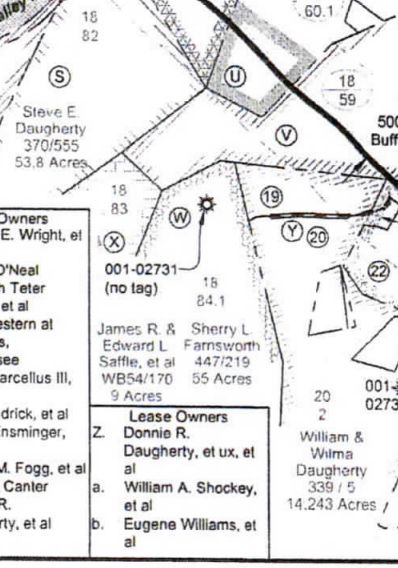
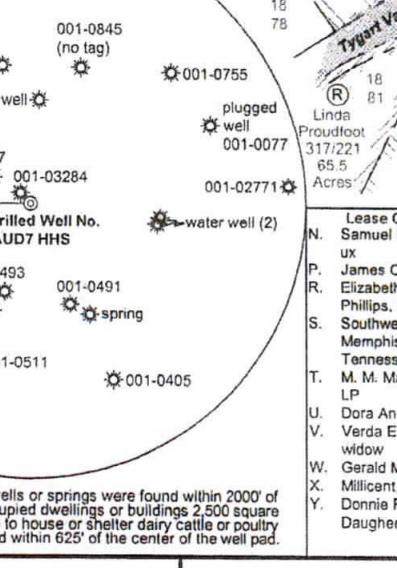
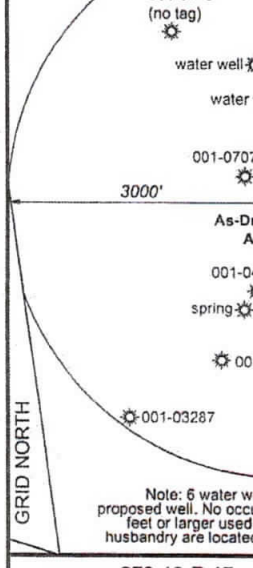
*Dwayne D. Matheny*  
 Dwayne D. Matheny, P.S. 2070



**Legend**  
 ⊙ Proposed gas well  
 ⊙ Monument, as noted  
 ⊙ Existing Well, as noted  
 --- Creek or Drain  
 --- Existing Road  
 --- Surface boundary (approx.)  
 --- Interior surface tracts (approx.)



**SEAL**  
 DWAYNE D. MATHENY  
 LICENSED  
 No. 2070  
 STATE OF WEST VIRGINIA  
 PROFESSIONAL SURVEYOR



FILE NO: 279-10-P-17  
 DRAWING NO: AUD7 HHS As-Drilled Well Plat  
 SCALE: 1" = 1500'  
 MINIMUM DEGREE OF ACCURACY: Submeter  
 PROVEN SOURCE OF ELEVATION: CORS, Bridgeport, WV

**STATE OF WEST VIRGINIA**  
 DEPARTMENT OF ENVIRONMENTAL PROTECTION  
**OIL AND GAS DIVISION**

DATE: April 8 2019  
 OPERATOR'S WELL NO. AUD7 HHS  
 API WELL NO  
 47 - 001 - 03351  
 STATE COUNTY PERMIT

WELL TYPE:  OIL  GAS  LIQUID INJECTION  WASTE DISPOSAL  
 (IF GAS) PRODUCTION:  STORAGE  DEEP  SHALLOW

LOCATION: ELEVATION: 1565' WATERSHED: Elk Creek  
 DISTRICT: Philippi Brian E. &  
 SURFACE OWNER: Lisa L. Murphy  
 ROYALTY OWNER: Junior & Lucy P. Lantz, et al; et al LEASE NO: 085710 ACREAGE: 37.83;

PROPOSED WORK:  DRILL  CONVERT  DRILL DEEPER  FRACTURE OR STIMULATE  PLUG OFF OLD FORMATION  
 PERFORATE NEW FORMATION  OTHER PHYSICAL CHANGE IN WELL (SPECIFY) \_\_\_\_\_ 7,312' TVD  
 PLUG AND ABANDON  CLEAN OUT AND REPLUG TARGET FORMATION: Marcellus Shale ESTIMATED DEPTH: 19,593' MD

WELL OPERATOR: HG Energy II Appalachia, LLC DESIGNATED AGENT: Diane C. White  
 ADDRESS: 5260 Dupont Road ADDRESS: 5260 Dupont Road  
 Parkersburg, WV 26101 Parkersburg, WV 26101